Studies on the Catalytic Action of AlCi

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4. These results are qualitatively explained by the velocity equation which is derived from the assumption that the reaction of H_2 with CO_2 activated by the adsorption on the quartz surface is the rate determining step, and that the CO_2 adsorption is retarded markedly by the adsorptions of H_2O produced.

5. The apparent Arrhenius' activation energy of this reaction is 25 Kcal.

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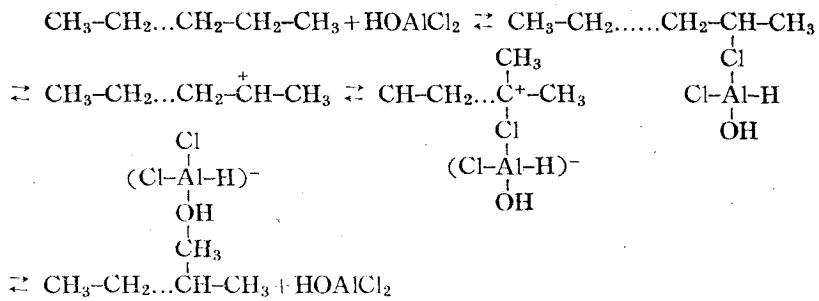
23. Studies on the Catalytic Action of $AlCi_3$.

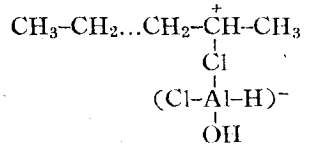
Kimio Tarama and *Toshiaki Kubota.*

To clarify the mechanism of the catalytic isomerization, decomposition and alkylation reactions of n-heptane by $AlCl_3$, the conductivities of catalyst layers were measured. The change of conductivities did not occur under anhydrous condition, but were found to be more remarkable according to the increase of water content in catalyst. The most remarkable change occured under the condition of the mol. ratio of $H_2O/AlCl_3=0.015$, where the catalyst is most active for the isomerization.

From these results, the following mechanism is proposed, i.e. the reaction proceeds through the ionic intermediate complex between heptane and $Al_2Cl_{(6-n)}(OH)_n$, produced from $AlCl_3$ and H_2O, in which n is smaller than 0.5 (simply represented by $OHAlCl_2$).



The fact of progress of decomposition in case of larger water content, is considered that the transfer of H-atom combined with attached to Al in



will be interfered. This supposition might be emphasized by the facts that the decomposition is promoted by the supply of D.S. voltage in the reaction system, and, on the other hand, n-heptane being predominantly decomposed, H-atom disappears in the form of chloroform by the catalyst, mixture of CCl_4 and $AlCl_3$, instead of H_2O.

Finally in case of much more water content, no decomposition occurred probably of the interference of the formation of ionic intermediate complex.